EP-3E Fiber Optics Integration & Support

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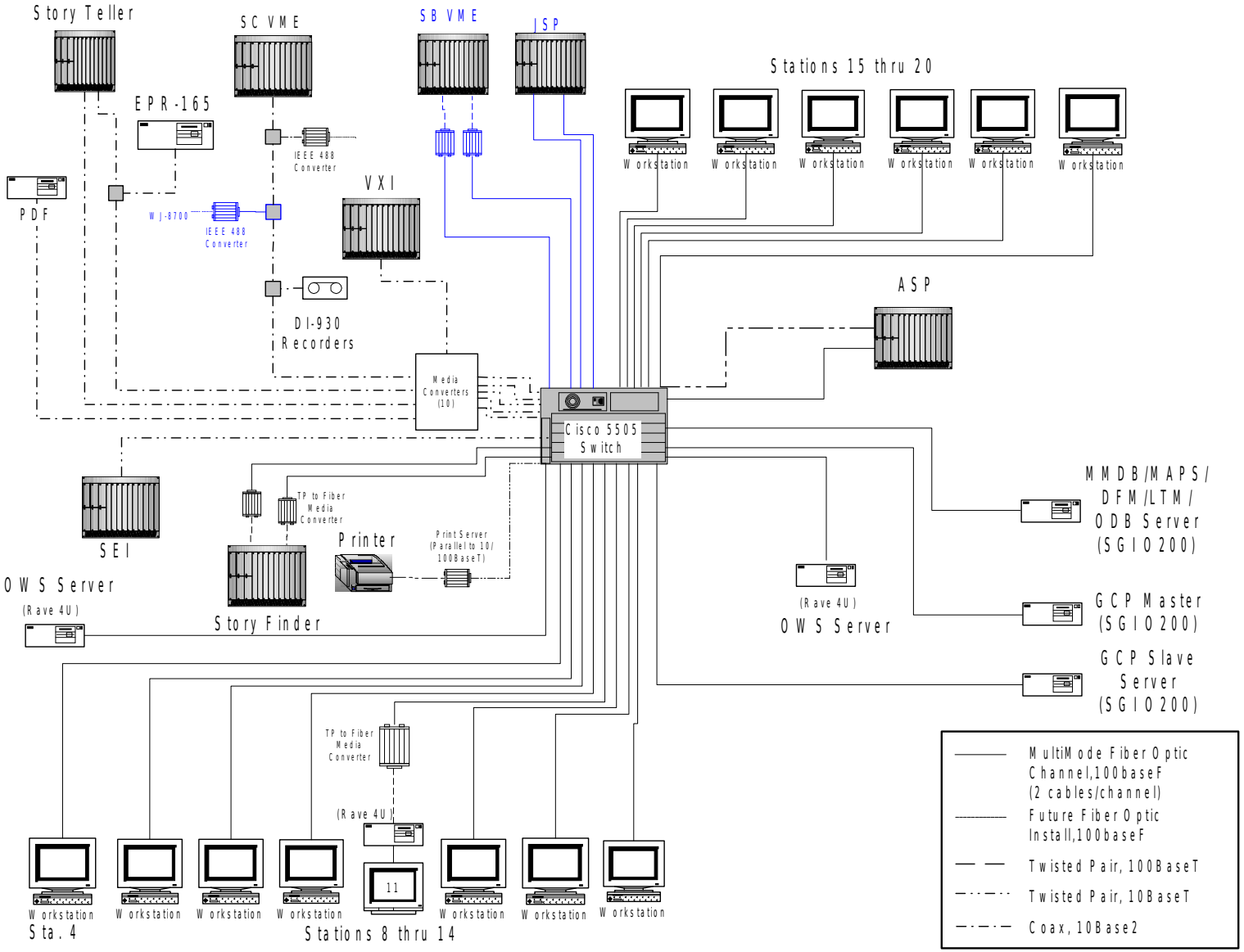
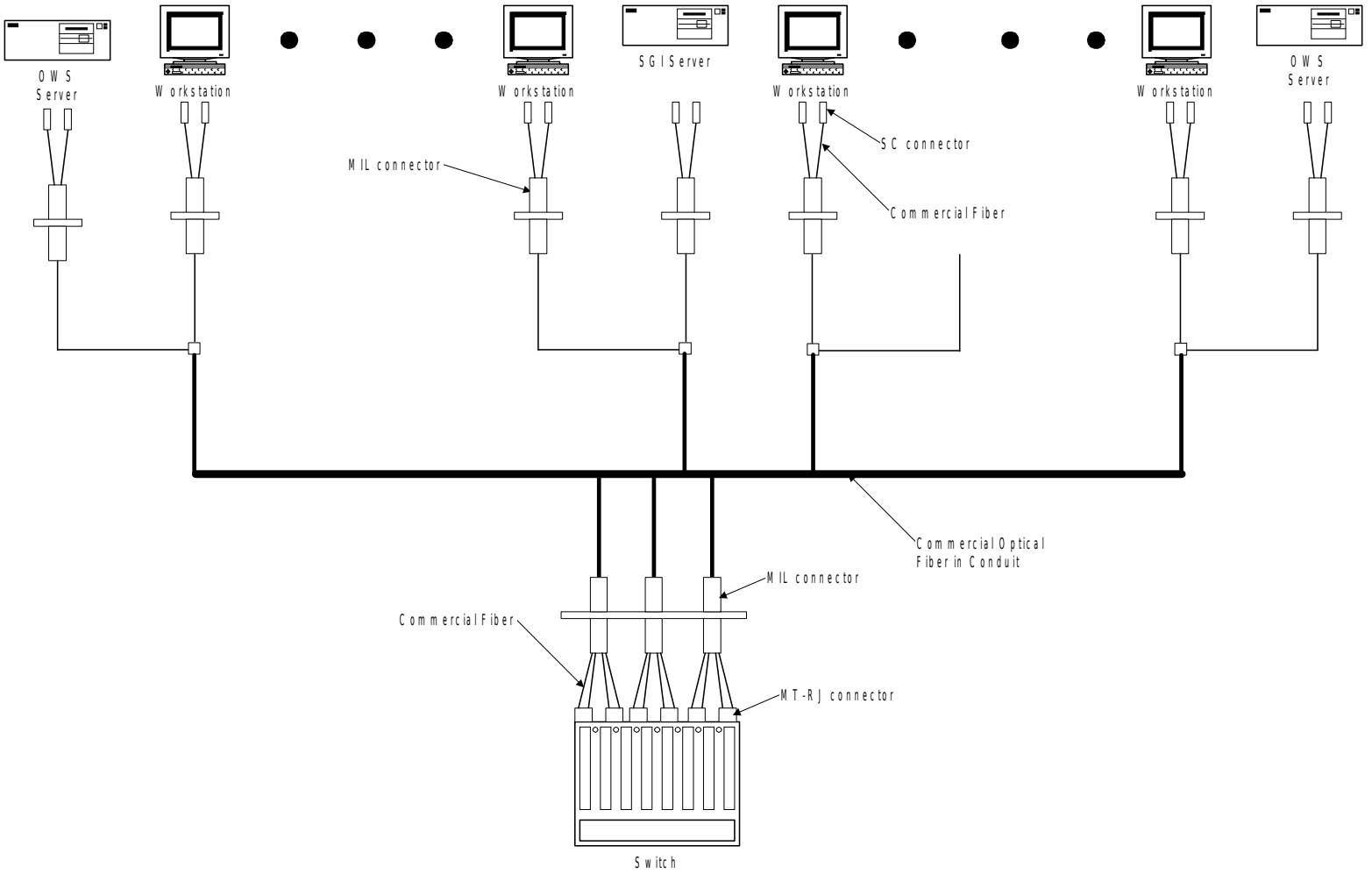
Design Overview

23 Oct 2001



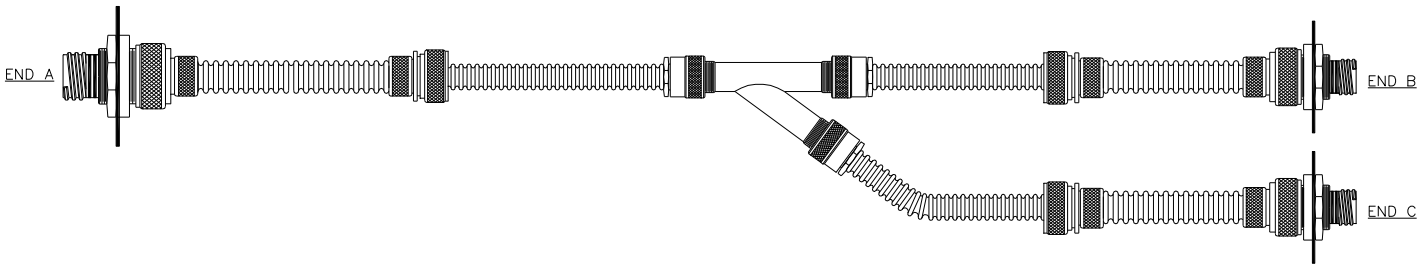
LAN Optical Cabling



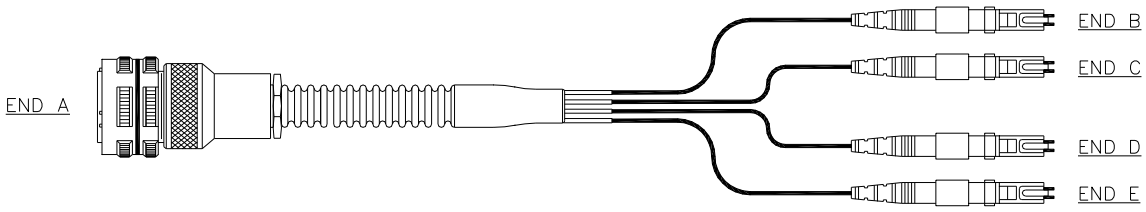
LAN Backbone

- Backbone: 100BaseFX Ethernet
  - Commercial, ruggedized fiber housed in ribbed, flexible conduit
  - 4 fibers dropped to each station
    - Two for current use
    - Two for growth/maintainability
  - 13 harnesses serving 25 100BaseFX ports
  - Utilizing commercial (SC and MT-RJ) and military connectors (MIL-C-38999)

LAN Backbone Cable

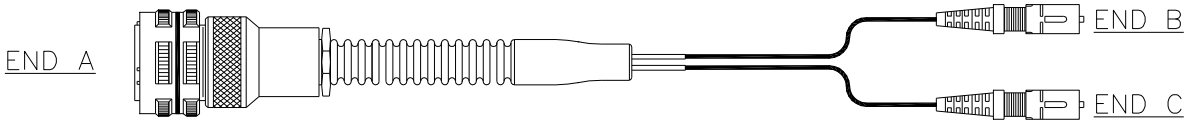


LAN Switch Pigtails



- Backbone to Switch Interface
  - Pigtailed with commercial fiber
  - MIL connector (8 contacts) to COTS connector (MT-RJ)

LAN Client Pigtails



- Backbone to Workstation/Server Interface
  - Pigtailed with commercial fiber
  - MIL connector (4 contacts) to COTS connector (SC)

EP-3 Fiber Optics Maintenance Concept

- Based on:
  - Prior EP-3 FO experience (High Band Prototype A/C)
  - Costs/Benefits Assessment
  - Operational Requirements
- Pigtail Integration Design:
  - Facilitates rapid fault isolation and maintenance actions
  - Relatively low cost maintenance/logistics solution
  - Pigtails are consumable items (PAOZZ)
  - Minimizes training requirements
- Backbone repair
  - 100% spare fibers in each harness
  - Swap termini from bad fiber to good one
  - Backbone replacement at Depot or with Depot team

Fiber Optic Aircraft Tool Kits

- Prototype Tool Kits Identified
  - KITCO to provide tool kits developed from NFOWG recommendations
  - EP-3 kits will support inspection, testing & termini/fiber switching(+)
  - In work (this week) to finalize kit configuration & delivery requirements
  - EP-3 to use initial kits during upcoming OPEVAL and provide feedback as necessary
  - EP-3 requires minimum of one kit for early maintenance teach in June 03
    - Working with KITCO to satisfy this requirement

Fiber Optic Reliability Data

- No real-world, EP-3 specific Fiber Optic reliability data available. No formal studies/NALCOMIS input completed
- Informal/anecdotal data from HBP, DT and on-going prototype installations are being assessed
- Initial failure cause indications:
  - Design deficiencies:
    - insufficient space allowances for cable stowage and connections; ribbed conduit catching on equipment rack structures
  - Aircraft production deficiencies:
    - short service loops; improper cable routing; improper connector assembly
  - Maintenance induced failures:
    - insufficient care in handling FO cables and connectors; exceeding bend allowances for fibers

Reliability and Maintainability

- Informal data (independent of MFGR specifications/data) suggests that FO cables and connectors are at least as reliable as wire cables/connectors when handled properly by trained maintenance personnel
- EP-3 maintenance concept as implemented & supply support planning (spare pigtails procured and provisioned) designed to enhance maintainability and supportability
- Design changes (ECPs), planned training and in-work technical manuals are expected to further enhance R&M

EP-3 Fiber Optics Training

- JMOD/SSIP Fiber Optics interim training plan
  - KITCO to provide training on site at VQ1/2 in May/June
    - Course to be tailored to EP-3E specific F/O connectors
  - Planning additional interim teaches Fall 2003
- JMOD/SSIP NAMTRA maintenance courses
  - To be updated to include EP-3E specific F/O maintenance concept and backbone connector repair

EP-3 Concerns

- Technology Turnover and obsolescence
  - Advances in fiber technology show a distinct potential to cause further configuration management problems within platforms
  - Upgrades to fiber LAN backbone (EP-3 application) will require Depot level maintenance
    - Costly and removes valuable DoN assets from service for significant periods of time
  - WRA's for routing and switching signals from fiber (LAN Switch, Media Converters) to wire in EP-3 current design have gone from "state of the art" to obsolete between system design and OPEVAL

Questions/Comments
POC's

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